Information-Seeking Behavior and Reference Medium Preferences

Differences between Faculty, Staff, and Students

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This study examined the information seeking preferences of 936 university faculty, staff, students, and librarians at a doctoral granting institution in the southeastern United States. Participants were asked to identify in what way they would prefer having both factual and research questions answered by the library. Findings suggest participants preferred face-to-face reference interactions over a suite of virtual reference options. In the aggregate, e-mail was the preferred virtual reference service over telephone and online chat with little interest in text messaging or Skype video. Statistically significant differences among users, however, emerged when interactions between type of question, age, race, and gender were considered. Faculty and staff preferred e-mail and telephone while students preferred online chat and, to a lesser extent, text messaging. Implications of the study suggest user preferences appear to be significantly influenced by demographic factors and type of question. Different library reference support strategies may need to be designed and implemented to meet those needs.

In the rapidly moving world of the information age, information seeking behavior is increasingly multifaceted, on demand, real-time, and diverse. Despite the emergence of the Internet and the availability of a wide variety of robust search engines that can seek information with increasing speed and accuracy, people are turning to their school, public, and academic libraries more frequently and in larger numbers than ever before.[1] Libraries are urgently attempting to reinvent themselves and fully embrace the challenge of meeting the needs of their users in a climate of rapid change where information seekers have many options, little patience, and use many different types of information and communication technology.

As academic libraries become fully immersed in the twenty-first century, they are beginning to realize that to best meet user needs, they must first look at user preferences. With the proliferation of online resources and distance education opportunities, many libraries are attempting to meet user demands by expanding their reference services beyond the face-to-face or telephone reference interaction. Rather than offer a one-size-fits-all reference service, many libraries now provide a suite of reference services which include both synchronous (real-time interaction such as online chat or video conferencing) and asynchronous reference services (such as e-mail and short messaging service (SMS)/text messaging). Developing a multifaceted "Ask a Librarian" approach to electronic reference "introduces the element of user preference to information assistance."[2]

By offering a range of platforms, libraries seek to provide reference services at the point-of-need for their users.

While libraries are developing new reference services, providing these services is not always matched by actual use.[3] This has led to a number of digital reference projects being suspended or discontinued. Several recent studies suggest that the success of virtual reference does not depend solely on the quality of service.[4] Further, the design of the virtual reference interface may not play a major role in determining users' opinions of virtual reference services. In a two part survey (n = 100 academic library websites) and virtual reference services usability study (n = 23), Mu et al. found

> there is no significant difference in users' opinions of a VRS [virtual reference service] and their willingness to use it that is caused by the design of the interface, provided the link meets two conditions: users are aware of its existence (it is easily seen), and the link is clearly labeled with its function (i.e., the text "Ask a Librarian" as opposed to a text-free image).[5]

Other studies have found that users prefer particular types of reference mediums for particular types of questions.[6] Rather than promote the "build it and they will come" approach to library services, library staff may want to first examine who their users are and their respective preferences and then develop library services to support them.

Understanding user information seeking behavior within the library context will help better inform libraries about reference user preferences. Realizing differences in user preferences by type of user, age, and gender will allow libraries to design their information services with greater precision, effectiveness, and efficiency. Do actual differences exist? This study seeks to answer this question by examining information seeking behavior and reference service preferences of university faculty, staff, students, and librarians at a doctoral granting institution in the southeastern United States.

LITERATURE REVIEW

User Information Seeking Preferences for Reference Services

The research literature on user information seeking preferences and references services presents mixed results. In a survey of 197 respondents across two Washington State University campuses, Cummings et al. found users preferred seeking library assistance through the library website (42.4 percent, n = 70), reference librarian (14.5 percent, n = 24), friend (10.9 percent, n = 18), online chat (10.3 percent, n = 17), telephone (10.3 percent, n = 17), e-mail (7.2 percent, n = 12), and other (3.6 percent, n = 6).[7] In a separate study of 276 students and faculty at two four-year public universities in the South Atlantic region, however, Johnson found face-to-face and e-mail to be the most popular reference mediums.[8] In this study, survey respondents listed their first choice for seeking reference help

with a research project as face-to-face (66.4 percent, n = 174), followed by e-mail (20.2 percent, n = 53), telephone (9.2 percent, n = 24), and online chat reference (4.2 percent, n = 11).

Granfield and Robertson found that preference for a reference medium may be dependent upon whether an individual is seeking assistance from within the library or virtually.[9] In a survey of 348 library users at two universities in Toronto (n = 106 virtual reference survey respondents and n = 242 reference desk survey respondents), they found virtual survey respondents (n =106) preferred online chat (4.3 average on a scale of 1–5 with 1 = lowest and 5 = highest preference), followed by the library website (3.7 average), e-mail (3.1 average), Google/search engine (3.1 average), telephone (2.9 average), and other (1.9 average). Reference desk survey respondents (n = 242), however, indicated their first choice for receiving research help if off-campus would be the library website (4.3 average), followed by Google/search engine (3.9 average), e-mail reference (2.9 average), telephone (2.6 average) and virtual [online chat] (2.6 average), and other (2.4 average); if these same respondents were already in the library their first choice for seeking research help was the library reference desk (4.3 average for virtual survey respondents, 4.4 average for reference desk respondents), followed by the library website (3.5 average for virtual survey respondents, 3.8 for reference desk respondents), and virtual reference [chat] (3.4 average).

While face-to-face, telephone, e-mail, and chat reference are becoming commonplace, text and video reference are newly emerging reference mediums in many academic libraries. Though there is little comparative data about user preferences for these services, research suggests that usage of these emerging reference mediums is limited. In a review of digital reference activity for two semesters at Southeastern Louisiana University, researchers found text messaging constituted only a small portion of digital reference activity. Of 1,447 requests for information via digital reference 66 percent (n = 954) were via chat, 28 percent (n = 410), were via -e-mail, and 6 percent (n = 83), were via text messaging.[10]

Usage of online video conferencing as a reference medium is beginning to emerge within academic libraries. Enhancing online reference service with audio and video capability holds the promise of duplicating the physical reference encounter.[11] Preliminary findings of two pilot projects at Ohio University Libraries, however, found usage of Skype video reference (a hybrid of online chat, audio, and video conferencing) was limited. Booth noted, "Although video is enabled on the desk computer most users prefer voice or chat options."[12]

Interestingly, despite the wide variety of options, literature suggests that when given a choice, in-person, face-to-face interaction with a librarian is the first choice for the majority of library users seeking assistance.

Are Particular Types of Reference Mediums Better Suited for Particular Types of Questions?

Throughout the literature, research findings suggest that different types of reference mediums are better suited for

particular types of questions. In a review of 209 instant message reference transactions at Southern Illinois University, Desai found instant messaging reference "is good for quick exchanges and anonymous sharing of information. But as in traditional face-to-face reference, patrons ask a wide variety of questions, some requiring extensive answers."[13] In a survey study of 345 chat users, Ward found that undergraduates saw the "chat" service as being applicable for most situations, while graduate students recommended the service noticeably more for ready reference questions.[14]

In a review of both chat and e-mail reference transcripts, Lee found many similarities among the questions asked using the two mediums.[15] He found both chat and e-mail virtual reference received approximately the same proportion of questions about finding known items and research and reference. Differences, however, were noted between the two mediums. He found e-mail received a small, though significant, number of questions about referencing and citation, while chat received none of these questions. E-mail received a higher number of administrative questions, though a much lower number of questions about accessing databases and electronic resources.

In a review of digital reference questions at an academic university, Hill et al. found text messaging reference to be a unique service well suited for short answer questions. They noted,

> Most of the questions [via text reference] have been of the short-answer variety. Many have been related to the library (e.g. renewal of books) or the university (location of computer facilities). . . . However, the service also prompted short-answer reference questions . . . that are atypical of reference questions received via phone, email, and chat.[16]

Though this study found usage of text messaging to be limited, current trends reported by the Cellular Telecommunications Industry Association (CTIA) suggest text messaging reference may soon become a more prevalent reference medium, regardless of the type of question. Between June 2007 and June 2008, CTIA reported a 160 percent increase in the number of text messages sent (from 28.8 billion to 75 billion).[17]

Finally, though providing digital reference services may be an attempt to duplicate the face-to-face reference transaction, users may not approach video reference with the same intentions as they may a physical reference desk. Booth noted, "Overall trends confirmed our hypothesis that . . . [Skype] . . . would serve as a source for basic information rather than an in-depth point."[18] If basic information is the primary information seeking purpose then there may not be a need or desire for the face-to-face interaction video chat such as Skype and other similar services would provide.

Are There Differences in User Preferences for Virtual Reference Mediums Based on Type of User?

While type of question may play a factor in reference medium choice, another factor to consider is the role of the user. The literature, however, suggests that regardless of age or role, information seeking behavior tends to follow the Principle of Least Effort. Poole found the Principle of Least Effort to be the strongest result in a review of a dozen information seeking studies.[19] "Least effort" does not mean people choose the lazy route but rather, information seekers, in general, attempt to minimize the overall work associated with something both now and in the future. Rubin further explains that "people will seek the most convenient source to meet their information need."[20] This principle is illustrated in a focus group study of 33 university faculty, undergraduates and graduate students at University of Idaho Library. In this study, Young and Von Seggern found that when considering criteria for information seeking, concern for time spent in locating information was brought up the most often across the board, regardless of university status. Study participants rated most information seeking experiences based on how much time they took and often will accept inappropriate information or information of lower quality if finding it takes less time.[21]

Though humans may follow the path of least effort, this path differs among particular types of information seekers, as depth of information needs may differ according to university status. In a study of health sciences university faculty, students, and residents, De Groote, Hitchcock, and McGowan found that "as users have become more sophisticated information seekers, their demands of librarians have evolved to require more . . . in-depth assistance rather than traditional ready reference questions."[22] This may suggest that university faculty or graduate students may choose a more robust reference medium such as e-mail to meet their research needs, while undergraduates, whose overall research needs may be posited to be of lesser depth and complexity, may choose a reference medium such as online chat or text messaging, mediums which lend themselves to quicker exchanges of less dense information. Differences in preferences between undergraduate and graduate students were found in a study conducted by Ward.[23] This is further illustrated in a study by Houlson, McCready, and Pfahl in which analysis of 631 chat transcripts across different academic library user groups revealed that "How to Find" questions were the main type of question being asked via online chat for undergraduates (24 percent, $n = 24$), graduate students (10 percent, $n = 36$), and staff (7 percent, $n = 28$).[24] Two other categories, however, stand out for each user group within this study. Undergraduates' second and third top categories were "Subject Specific" (in-depth questions about a particular research topic) (17 percent, $n = 66$) and "Do You Own" questions (5 percent, $n = 20$). Graduate students' second and third top categories were "Technical Difficulties" (7 percent, $n = 27$) and "Do You Own" (7 percent, $n = 25$), while staff's second and third top categories were about "Document Delivery" (4 percent, $n = 15$) and "Technical Difficulties" (4 percent, $n = 15$).

While role may influence the depth of information need, age may increasingly become a factor in reference medium choice in the not-so-distant future. Current trends suggest that as today's adolescent population enters college campuses within the next five to ten years, a shift toward seeking information

or reference assistance via one's mobile device, such as using text messaging may become more common. CTIA's research report, "A Generation Unplugged," revealed an exponential increase in text messaging among young adults aged 13 to 19 years, with the proportion of "Time Spent Talking VS. Texting" increasing in favor of texting among younger respondents.[25] Age may play a further role in the selection of virtual reference medium as it relates to one's comfort or intimidation with particular choices. In an online survey of 137 individuals who had used virtual reference (online chat) services in the past, Connaway and Radford found Net Generation users (age 12–28 years) rated online chat as the least intimidating method of seeking reference assistance (76 percent, n =37), followed by e-mail (14 percent, n =7), text (6 percent, n = 3), face-to-face (4 percent, n =2), and telephone (0 percent, n =0). Adults (29 years or older), however, rated chat (36 percent, n =12) and e-mail (36 percent, n =12) equally least intimidating, followed by face-to-face (15 percent, n =5), telephone (12 percent, n =4), and text (0 percent, n =0) (p. 170). In this same study, researchers found the leading factors for choosing virtual reference service (online chat) were convenience, anytime/anywhere access, immediacy, and efficiency.[26]

Current literature suggests users may select their virtual reference medium according to the type of question they have. Role may also be an influencing factor in determining reference preferences. No study, however, has examined these questions collectively and with a large enough sample size for significant statistical analysis. This study attempts to meet this need by examining the relationship between type of question, type of user, and preferences for particular reference mediums from both user and library service provider perspectives by studying five discrete groups: faculty, staff, graduate students, undergraduate students, and librarians. The purpose of the study is to seek answers to three research questions:

RQ1: Which virtual reference mediums do library reference users prefer?
RQ2: Are there differences in user preferences for virtual reference mediums based on type of question?
RQ3: Are there differences in user preferences for virtual reference mediums based on type of user and type of question?

METHOD

To assess user information seeking and library reference preferences, this study examined user preferences for face-to-face and five virtual, or not in person, reference support services offered by an academic library—e-mail, telephone, online chat, Skype video conference, and text messaging. Prior experience with university library services and whether there was an interaction effect between type of user, type of question, and reference medium were also explored.

The study used a mixed-method design consisting of a university-wide online survey, focus group, and interview over a four month period at a mid-sized public university in the southeast with a student population of approximately, 18,500 (79 percent undergraduates and 21 percent graduate students), a figure that includes nearly 1,000 distance learners.[27]

Participants

An online survey was sent via e-mail to a randomly selected group of university students (N = 2,552) with a 14.2 percent (n = 362) response rate and to all permanent faculty and staff (N = 3,840) with a 14.3 percent (n = 551) response rate. While a total of 936 participants completed some portion of the survey, the overall completion rate of the entire survey among participants was 84 percent (N =783). Demographically, study participants were 31 percent staff, 30 percent faculty, 22 percent undergraduate, and 17 percent graduate students, predominately female (71 percent to 29 percent male), and predominately white (78 percent, 12 percent black, 5 percent Asian/Pacific Islander, and 4 percent multiracial). Age range was fairly equally distributed with 25 percent coming from the 25–34 age group, 20 percent under 24,19 percent from both 25–44 and 45–54, 16 percent from 55–64, and 2 percent were 65 and up.

A focus group (n = 13) with the university library reference department and an interview with the manager of reference services were also conducted.

Materials, Instrumentation, and Data Analysis

Types of Virtual Reference Services Offered at the University Library

Six means for obtaining reference assistance were available to participants in the study through the traditional types of reference services provided by the participating academic library: face-to-face, e-mail, telephone, online chat (instant messaging), text-messaging (using a cell phone), or Skype video conferencing. The virtual reference services are accessible from the library's website, as illustrated in figure 1. Users can seek *face-to-face reference* services by approaching the reference desk, which is located on the ground floor and is situated strategically along the main walkway of the library.

E-mail reference services involve users either e-mailing the reference desk via an online e-mail form available from the library's *Ask Us!* webpage or contacting a departmental liaison directly. Incoming e-mails from the *Ask Us!* page are sent to a departmental e-mail address which one individual is assigned to monitor at any given time. Additionally, numerous library subject/research guides are available on the library's website, each containing e-mail links to subject specialists within the library.

Telephone reference services involve users either calling the general reference desk or contacting their departmental liaison directly. Both local and toll-free telephone numbers are available on the library's *Ask Us!* webpage and throughout the library's website.
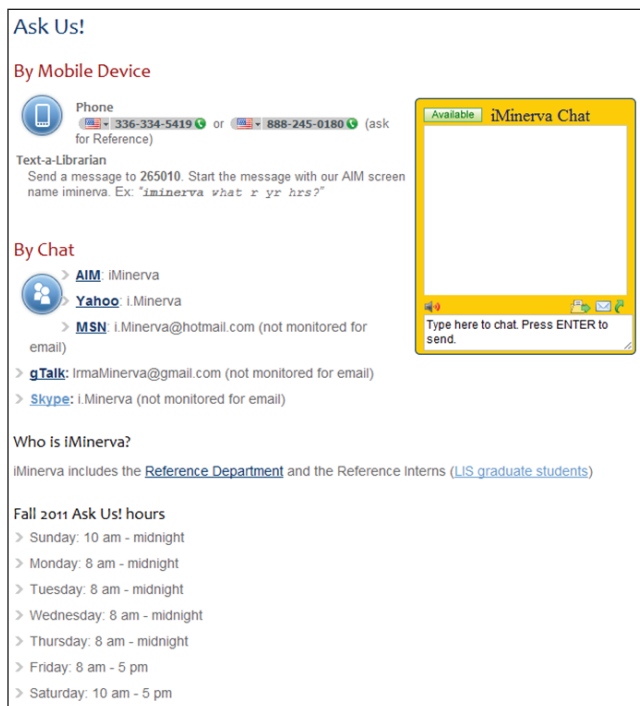
Figure 1. AskUs! Reference Services Website

Online chat or *instant messaging reference* services involve users engaging in an online chat with the reference desk through an embedded chat feature available from the reference department's *Ask Us!* webpage, the main library homepage, and on each library subject/research guide. If monitored, the online chat box will display "available." The university library uses an online chat management system, "Library H3lp," which allows an unlimited number, though typically around five or six, library reference staff members to be logged in and monitoring incoming chat messages at any given time. Two reference staff members housed in a back office of the library monitor telephone and online chat reference inquiries. Two or three additional library staff may be logged in and monitoring incoming chat questions at any given time from their respective work areas. Additionally, the library participates in a 24/7 cooperative, NCknows, which offers online chat assistance provided by librarians from across the United States. A link to this service is provided from the library reference department's *Ask Us!* webpage.

Text messaging reference services involve users sending a text message from a mobile device such as a cell phone or PDA (personal digital assistant) that will be received as an online chat request by the reference desk. There is no option to send a text message directly to an academic liaison. Per the library's *Ask Us!* webpage, individuals are instructed to send text messages to a specified number and begin messages with a screen name that is provided on the library webpage. Text messages are limited to 160 characters. On the library's end, text messages come into the library via the online chat

management system. From the librarian's perspective, text messages appear identical to IM messages, with the exception that a text message will have a telephone number identifier at the beginning of each chat line rather than "guest," which identifies an online chat user.

Online video conferencing reference services at the participating library involve a user seeking reference help through Skype video conferencing. Skype, a free software application, allows users to make voice and video calls over the Internet. Library users seeking video reference assistance will find the library's Skype screen name on the library's *Ask Us!* webpage. A library user may either call (voice only) or video call (voice and video) a library reference staff member. If monitored, a librarian will "answer" the call and the reference interaction will proceed. Currently, only one librarian monitors Skype video conferencing reference calls for this library. If he is not available, the Skype reference call will go unanswered and the library patron will be provided with a link directing him to other reference options. Staffing levels would increase if the demand for this service increases in the future.

Online Survey Instrument

An 11-item online instrument was developed by the authors to determine virtual reference user preferences of university patrons. While some questions were based off instruments from previous research studies, the survey was formulated based on the study's unique research questions. Questions 1–4 sought demographic information (university classification, gender, race, and age). Questions 5 and 6 inquired about participants' prior experience with and knowledge of reference services at a university library. Questions 7 and 8 asked participants to rank order their virtual reference seeking preference for answering a procedural based, research question and quick, factual question. Questions 9 and 10 examined user preference from another perspective by allowing respondents to choose only one reference service for both a procedural and factual question, but this time including face-to-face reference as an option. The final question dealt with user preferences for future reference services.

The instrument was pilot tested with graduate students (n = 3) for preliminary face and construct validity and reliability, refined accordingly, and then administered via e-mail by the university's institutional research office. See appendix A for the full instrument.

Librarian Focus Group and Interview

Reference library staff (n = 13) also participated in a focus group. During this session, participants responded to six questions developed to ascertain their thoughts and preferences surrounding virtual reference, as well as predict future trends. Questions used included Q2, "Based upon your experience, which of the reference mediums (e-mail, telephone, online chat, Skype video, text messaging) is most popular with library patrons at XXXX?"; Q3, "Which of the

five reference mediums (e-mail, telephone, online chat, Skype video, text messaging) do you prefer?"; and Q6, "Where do you think the future of virtual reference is heading?" See appendix B for the full instrument.

The interview with the reference department manager utilized a set of 18 open-ended questions to ascertain her thoughts and opinions about providing reference services.

Data Analysis

Using Excel and SPSS 17.0, results were analyzed using qualitative factor analysis of open ended comments, descriptive statistics, differences in means across user groups through analysis of variance (ANOVA), which is used to compare one dependent variable across multiple independent groups, multivariate analysis of variance (MANOVA), which is used to compare multiple dependent variables across multiple independent groups, Fisher's least significant difference (LSD) post hoc tests, analysis of covariance (ANCOVA), linear regression curve fit, and Pearson Product Coefficient correlations.

RESULTS

Participants Most Familiar With and Aware of Face-to-face and E-mail Reference Services

Seventy two percent of respondents had prior experience with at least one form of reference service at the university library that was studied:

- Face-to-face reference was the most commonly used (49 percent, $n = 451$).
- E-mail was the second most commonly used (36 percent, $n = 330$).
- Telephone (24 percent, $n = 218$) was third.
- Online chat (15 percent, $n = 142$) was a distant fourth.
- No respondents had used the library's Skype video chat reference.
- Faculty members were the majority users for face-to-face, e-mail, and telephone.
- Undergraduate students were the majority users for online chat and text.

In terms of general awareness, the most well known was face-to-face reference (90 percent, $n = 833$) followed by e-mail (71 percent), telephone (68 percent), and online chat (53 percent). Only a minority of participants were aware that text (26 percent) and Skype (15 percent) reference services were available.

Different Virtual Reference Preferences by Question Type

In the aggregate, for both factual and research questions combined, when participants were asked to select just one option, the most selected was (see figure 2):
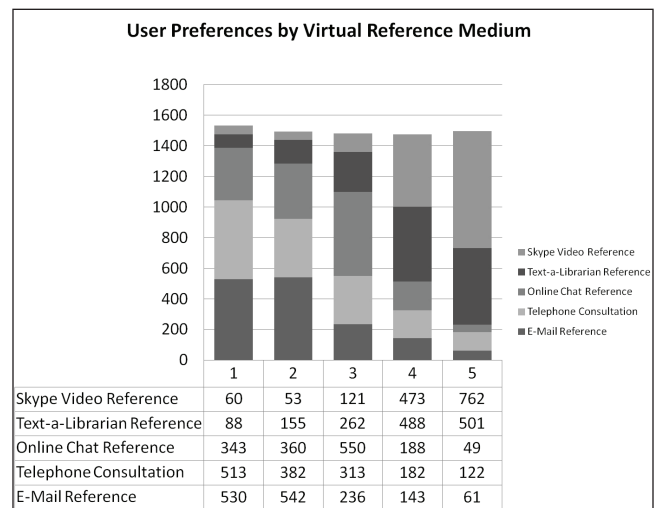

User Preferences by Virtual Reference Medium

	1	2	3	4	5
Skype Video Reference	60	53	121	473	762
Text-a-Librarian Reference	88	155	262	488	501
Online Chat Reference	343	360	550	188	49
Telephone Consultation	513	382	313	182	122
E-Mail Reference	530	542	236	143	61

Figure 2. Preferences for Virtual Reference

- E-mail first (35 percent, $n = 530$).
- Telephone (33 percent, $n = 513$) was a close second.
- Online chat (22 percent, $n = 343$) was third most selected.
- Text (6 percent, $n = 88$) and Skype video (4 percent, $n = 60$) were a distant fourth and fifth.

Disaggregating the data, however, by type of question (factual and research) identified statistically significant trends and differences. Participants were asked to rank their preference for five virtual reference types from 1 to 5 (1 = highest, 5 = lowest ranked) if asking both a quick factual question and a longer research question:

- E-mail again had the highest mean ranking across both types of questions at 2.2 out of 5.
- Telephone was again second with a 2.4 average rating.
- Chat was third with a 2.5 average rating.
- Text, 3.7, and Skype, 4.2, were least preferred.

For quick factual questions specifically, however, telephone was the highest rated (see figure 3):

- Telephone was ranked the top choice by 38 percent ($n = 290$) of all participants.
- E-mail was the second choice selected by 27 percent ($n = 209$).
- Online chat was third, selected by 24 percent ($n = 182$).
- Text at 8 percent ($n = 60$) and Skype at 3 percent ($n = 28$) were the least preferred.

To determine whether there were statistical differences between user preferences for a particular reference medium for factual questions, a multivariate analysis or MANOVA was conducted. Overall, a statistically significant difference between user rankings and reference medium for factual questions was found, F (11, 1854) = 6.58, $P < .000$; Wilk's
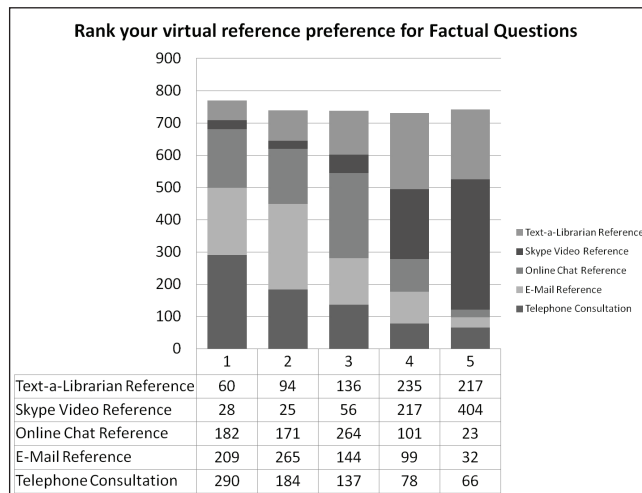
Rank your virtual reference preference for Factual Questions

	1	2	3	4	5
Text-a-Librarian Reference	60	94	136	235	217
Skype Video Reference	28	25	56	217	404
Online Chat Reference	182	171	264	101	23
E-Mail Reference	209	265	144	99	32
Telephone Consultation	290	184	137	78	66

Figure 3. Preferences for Factual Questions

λ =0.896, partial $\varepsilon2$ = .036, which suggests that these differences were statistically significantly different enough to represent different populations. More specifically, user preference rankings were statistically significantly different across users for three reference mediums—telephone (F (3, 708) = 4.49, p < .004), e-mail (F (3, 708) = 15.00, p< .000), and text (F (3, 708) = 16.83, p < .000).

For research questions, e-mail was most preferred (see figure 4):

• E-mail was the preferred reference type 42 percent (n = 321) of all participants.
• Telephone was second at 29 percent (n = 223).
• Online chat was a distant third at 21 percent (n = 161).
• Text and Skype were a distant fourth and fifth, respectively.

Like factual questions, the differences in preferences between user groups were found to be statistically different from one another. MANOVA indicated a statistically significant difference between user rankings and reference mediums for research questions, F (11, 1934) = 6.89, P < .000; Wilk's λ = 0.895, partial $\varepsilon2$ = .036. Rankings were statistically significantly different across users for all five reference mediums—telephone (F (3, 738) = 9.01, p < .000), e-mail (F (3, 738) = 11.831, p < .000), online chat (F (3, 738) = 6.57, p < .000), Skype (F (3, 738) = 4.46, p < .004), and text (F (3, 738) = 7.96, p < .000).

Different Virtual Reference Preferences by Question Type and User Group

Further disaggregating the data by user group (faculty, staff, undergraduate, and graduate) as shown in table 1 identified additional significant differences by question type:

• Faculty, staff, and graduate students ranked e-mail and telephone as their first and second choices, respectively.
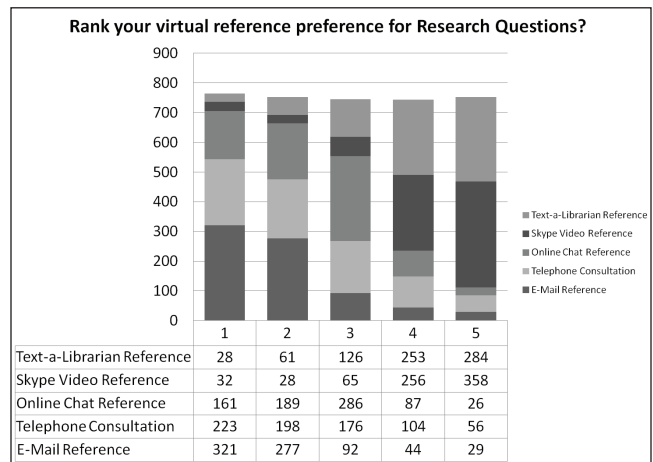

Rank your virtual reference preference for Research Questions?

	1	2	3	4	5
Text-a-Librarian Reference	28	61	126	253	284
Skype Video Reference	32	28	65	256	358
Online Chat Reference	161	189	286	87	26
Telephone Consultation	223	198	176	104	56
E-Mail Reference	321	277	92	44	29

Figure 4. Preferences for Research Questions

• Undergraduate students ranked overall online chat as their top rated choice followed by telephone.
• Examining the interaction using one way ANOVA between type of user and reference medium rankings by type of question yielded statistically significant differences.

For factual questions, faculty, staff, and graduate students preferred e-mail and telephone almost equally, while undergraduates rated online chat higher. These data are further illustrated in table 2. Comparing virtual reference rankings across groups by factual question found:

• Statistical significance between group differences for user preferences for telephone (F (3,791) = 5.6), e-mail (F (3,799) = 14.50), and text (F (3,786) = 15.89) at the p < .001 level. No significant differences were found for chat and Skype (all users rated each consistently high and low, respectively).
• Fisher's LSD (least significant difference) test found that faculty, staff, and graduate student rankings were significantly higher than undergraduates with telephone (2.1 and 2.3 rankings compared to 2.6).
• Fisher's LSD test found that faculty and staff rankings were significantly higher for e-mail than undergraduate and graduate students (2.1 compared to 2.5 and 2.7 average ranking, respectively) and lower for text (4.0 and 3.8 compared to 3.2 and 3.4, respectively) within a 95 percent confidence level.

Comparing virtual reference rankings across groups by research question found:

• When seeking reference assistance for research questions, faculty, staff, and graduate students again ranked e-mail the highest while undergraduate students ranked e-mail and online chat equally high, as shown in table 3.
• One way ANOVA found user rankings for reference medium by research question were statistically significant

at the p < .000 level for telephone (F(3,790) = 10.87), e-mail (F(3,798) = 10.26), chat (F(3,783) = 7.47), and text (F(3,785) = 7.21) and at the p < .05 level for Skype (F(3,772) = 3.36).

- Fisher's LSD tests found that faculty, staff, and graduate students rankings were significantly higher than undergraduates with e-mail (1.8,1.8, and 2.0, respectively compared to 2.3).
- Fisher's LSD tests found that faculty and staff rankings were significantly higher for telephone than undergraduate and graduate students (2.2,2.3, respectively compared to 2.8 and 2.6).
- Undergraduate and graduate students ranked online chat significantly higher (2.3) than faculty and staff (2.7 and 2.6, respectively) as well as text reference (3.7 and 3.8, respectively compared to 4.2 and 4.3, respectively) within a 95 percent confidence level.

Qualitative Factor Analysis Suggests Convenience and Speed are Primary Factors

Conducting a factor analysis of survey participant qualitative comments suggests that for e-mail the primary factors behind user preferences focused on (see table 4):

- Convenience, familiarity, and ease-of-use.
- Second was that e-mails provide a written record that was precise and in-depth.
- Speed and quickness of response was the third most frequently mentioned reason for using e-mail.
- For chat, telephone, and text, the major focus was on speed and quickness first.
- Convenience, familiarity, and ease-of-use were second.
- Multitasking was a third factor mentioned with using online chat.

Face-to-face is Preferred Reference Service When Only Given One Choice

When respondents were asked to choose only one type of reference service including face-to-face reference (see table 5):

- Traditional face-to-face reference services was found to be, in the aggregate, the preferred method of reference (29 percent, n = 474).

Table 1. Preferences for Help by User Type

	E-mail	Telephone	Chat	Text	Skype
Faculty	1.9	2.2	2.6	4.1	4.2
Staff	2.0	2.2	2.6	3.9	4.4
Undergraduate	2.5	2.7	2.3	3.4	4.1
Graduate	2.2	2.5	2.3	3.6	4.3
Average	2.2	2.4	2.5	3.7	4.2

Table 2. Preferences for Help with Factual Questions by User

	Telephone	E-mail	Chat	Text	Skype
Faculty	2.1	2.1	2.5	4.0	4.3
Staff	2.1	2.1	2.6	3.8	4.4
Undergraduate	2.6*	2.7*	2.4	3.2*	4.1
Graduate	2.3	2.5*	2.4	3.4*	4.3
Average	2.3	2.4	2.5	3.6	4.3

*Post–hoc LSD was statistically significantly different than other groups within a 95% confidence level.

Table 3. Preferences for Help with Research Questions by User.

	E-mail	Telephone	Chat	Text	Skype
Faculty	1.8	2.2	2.7	4.2	4.2
Staff	1.8	2.3	2.6	4.0	4.3
Undergraduate	2.3*	2.8*	2.3*	3.7*	4.0
Graduate	2.0	2.6*	2.3*	3.8*	4.2
Average	2.0	2.5	2.5	3.9	4.2

*Post–hoc LSD was statistically significantly different than other groups within a 95% confidence level.

- E-mail (25 percent, n = 393) was a close second and still the preferred virtual reference medium.
- Telephone was third (17 percent, n = 274).
- Online chat was fourth (15 percent, n = 249).
- "Other" which was finding answers on the web (10 percent, n = 160) was fifth.
- Text (4 percent, n = 64) and Skype (< 1 percent, n = 2) were a distant sixth and seventh, respectively.

When broken down by user group, however, faculty actually preferred e-mail slightly over face-to-face. MANOVA found a significant main effect for user preference by medium, F (6, 1566) = 6.89, P < .05; Wilk's λ = 0.984, partial ε2 = .01.

With face-to-face as an option, type of question still had an impact on respondent preferences. Between-group differences for reference medium by factual question was statistically significant, F (3, 784) = 3.91, p < .01. Post hoc comparisons using the Fisher LSD test found that (see figure 5):

- Faculty preferred e-mail and "other" (online) as the

Table 4. Factor Analysis for Virtual Medium Preferences

	E-mail		
	Easy, familiar, convenient	Written record, in-depth, precise	Fast, immediate
Faculty	19	12	7
Graduate Students	13	7	3
Undergraduate Students	16	11	9
Totals	48	30	19

	Telephone	
	Immediacy, quick	Easy, familiar, convenient
Faculty	11	5
Graduate Students	7	3
Undergraduate Students	21	17
Totals	39	25

	Chat		
	Immediacy, fast	Comfort, convenience	Multitask
Faculty	8	5	-
Graduate Students	16	25	6
Undergraduate Students	18	19	2
Totals	42	49	8

	Text	
	Fast	Convenient
Faculty	-	-
Graduate Students	6	2
Undergraduate Students	10	11
Totals	16	13

preferred reference services at statistically significantly higher numbers than all other groups within a 95 percent confidence level.
- Staff preferred telephone and e-mail.
- Both undergraduate and graduate students preferred telephone and online chat almost equally.
- Face-to-face was ranked fourth overall for answering basic, factual questions.

For research questions, however, students and staff preferred face-to-face while faculty still preferred e-mail, as shown in figure 6. MANOVA found no significant between-group differences among users as overall ratings were similar across groups. Post–hoc LSD tests also found no significant differences.

Impact of Gender, Age, and Race

Gender Differences Across Reference Mediums

A comparison of mean rankings through MANOVA found no significant main effect for gender differences across reference mediums. A significant between-group effect for gender by type of question for text messaging was found for both factual

questions, $F_{(1, 749)} = 5.50$, p < .02, and research questions, $F_{(1, 784)} = 4.57$, p < .04. On average, males rated text lower ($M = 4.14$) than females ($M = 3.86$). Females ranked text in higher proportions at second ranked and fourth ranked (out of five) than males. Gender was found, however, to be a significant covariate for participant rankings for text for both factual and research questions, for Skype and research questions, and for selection of only one reference medium including face-to-face for factual questions.

Age Differences Across Reference Mediums

MANOVA found a significant main effect for age by virtual reference medium, $F_{(5, 3145)} = 1.54$, $P < .02$; Wilk's $\lambda = 0.907$, partial $\varepsilon 2 = .019$. For factual questions:

- One way ANOVA found significant differences for age by telephone, $F_{(5, 788)} = 9.40$, p < .000, e-mail, $F_{(5, 796)} = 4.95$, p < .000, online chat, $F_{(5, 781)} = 5.89$, p < .000, and Skype, $F_{(5, 770)} = 3.63$, p < .003.
- Post–hoc comparisons using the Fisher LSD test found that the 55–64 age group ranked telephone higher ($M = 1.84$) than all other groups except for the 65 and older group.
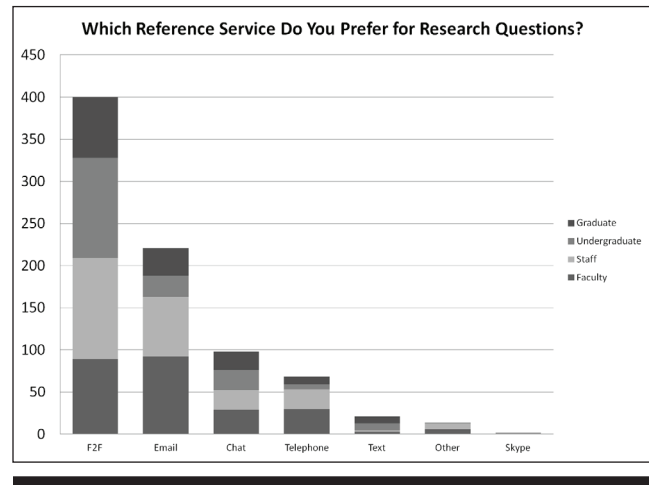
Table 5. Overall User Preference for Help with Face-to-Face as an Option

	F2F	E-mail	Telephone	Chat	Other	Text	Skype
Faculty	99	160	85	66	74	11	1
Staff	143	126	97	64	53	9	1
Undergraduate	149	46	46	64	24	36	0
Graduate	83	61	46	55	18	36	0
Average	119	98	69	62	42	23	1
Total	474	393	274	249	169	92	2
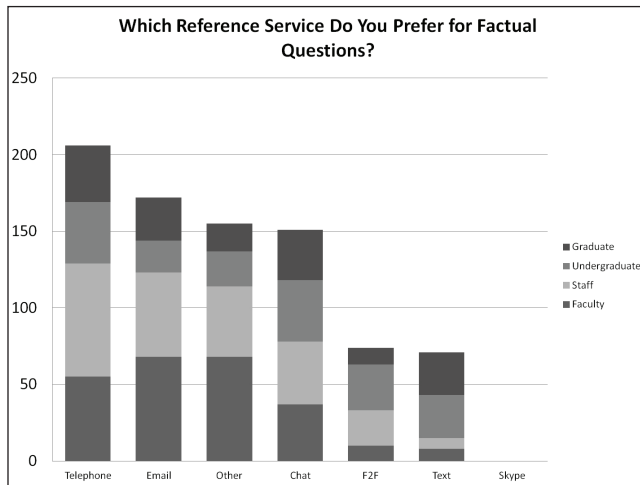
Figure 5. User Preferences for Factual Questions with Face-to-face as an Option

Figure 6. User Preference for Research Question with Face-to-face as an Option

- In contrast, the youngest group, 24 years and younger, ranked telephone statistically significantly lower (*M* = 2.55) than 45–54 age group (*M* = 2.17) and 55–64 age group (*M* = 1.83).
- For e-mail, there was a perfect inverse relationship between age and e-mail preference, the older the participant the higher e-mail was ranked, as the four oldest age groups, 65 and older, 55–64, 45–54, and 34–44 ranked it statistically significantly higher (*M* = 1.73, *M* = 2.07, *M* = 2.08, and *M* = 2.10, respectively) than the two youngest age groups, 24 years and younger and 25–34 years old (*M* = 2.69, *M* = 2.51, respectively).
- For online chat, the 55–64 age group (*M* = 2.79) preferred it statistically significantly less than all other age groups, except for 65 years and older.
- For text, similar to e-mail, a perfect inverse relationship occurred between age and preference. As would be expected, the 24 year and younger group ranked text statistically significantly higher (*M* = 3.22) than all other groups.

Controlling for age as a covariate through analysis of covariance (ANCOVA) found that age was a statistically significant factor for participant preference for all mediums with both questions except for e-mail by research question. When controlling for age, significant differences disappeared for telephone only for both factual and research questions. Age was not found to be a significant covariate when participants were asked to select only one reference medium, which included face-to-face as an option.

Race Differences across Reference Mediums

MANOVA found a significant main effect for race by virtual reference medium, F (5, 2306) = 2.38, *P* < .000; Wilk's λ = 0.887, partial ε2 = .030. One way ANOVA found significant differences between race and preferred reference mediums:

- For factual questions for all reference mediums except for telephone (ranked high by all groups) statistically significant differences for race were found: e-mail: F (5, 750) = 3.64, p < .003, online chat: F (5, 743) = 3.13, p < .008, Skype: F (5, 732) = 5.53, p < .000, and text: F (5, 744) = 4.05, p < .001.
- Post hoc comparisons using the Fisher LSD test found that white users significantly preferred e-mail (*M* = 2.24) than Asian/Pacific Islander (*M* = 2.65), multiracial (*M* = 3.25), and other (*M* = 2.77).
- For online chat, white (*M* = 2.43), Asian/Pacific Islander (*M* = 2.41), and other (*M* = 2.25) respondents preferred it significantly higher than black respondents (*M* = 2.86).

- For Skype, Asian/Pacific Islanders (M = 3.58) and Multi-racial (M = 3.50) respondents ranked it statistically significantly higher than white (M = 4.34), black (M = 4.32), and other (M = 4.50) respondents.
- For text, black (M = 3.15) and other (M = 3.15) respondents ranked it statistically significantly higher than white (M = 3.68), Asian/Pacific Islander (M = 3.91), and multiracial (M = 3.92).
- For research questions, one way ANOVA found significant differences between race and preferred reference medium for only two of the five mediums: e-mail: $F_{(4, 791)}$ = 3.05, $p < .02$ and Skype: $F_{(5, 765)}$ = 3.70, $p < .03$.
- Post–hoc tests show that white respondents ranked e-mail statistically significantly higher (M = 1.89) than black users (M = 2.24)
- Black respondents ranked e-mail statistically significantly lower than both white and Asian or Pacific Islander respondents (M = 1.77).

Impact of Race, Gender, and Age on Participant Reference Medium Preferences

Using analysis of covariance (ANCOVA) to examine the impact of race, gender, and age on reference medium preferences, it was found that race was not found to be a significant covariate, while both gender and age were. After controlling for both gender and age as covariates for participant rankings by virtual reference mediums:

- E-mail and text were still found to be statistically significant across participant groups by medium for both factual questions and research questions.
- When face-to-face was an option only face-to-face reference was still found to be statistically significant for factual questions.

These results suggest that age in particular has a significant effect on user preference for particular types of reference mediums, in particular online chat and telephone.

Librarians: Online Chat and E-mail are by Far the Most Popular

In a focus group conducted with reference librarians at the participating university library, participants indicated that online chat is "without a doubt" the most popular reference medium choice for library patrons both for quick factual questions and research questions. If individuals, however, already have established relationships with particular librarians (i.e., subject librarians or librarians embedded in classes), e-mail seems to be more popular. Usage of online chat and e-mail fluctuates depending on the time of day as well as the timeframe in which a library patron needs a response. If a student has an immediate need, they may choose online chat. If there is more flexibility, students may choose e-mail instead, which is consistent with the results from the university survey.

According to the reference department manager, telephone and e-mail reference requests have gone down. "I would say we're getting . . . maybe 30% of the calls we used to get . . . E-mail and phone have both gone down in the last 5 years definitely."[28] In contrast, chat has increased substantially, "Chat has gone up a lot. And that is true even with people being contacted in their offices. They're getting more e-mail and chat than they used to." It is important to note, however, that many reference requests are now going through specific departmental liaisons. The main reference desk does not field these requests; therefore these numbers are not reflected in the statistics.

Reviewing the reference department's statistics over the past five years supports the emergence of online chat, which increased 330 percent from 2005 (753 transactions, 3 percent of total) to 2010 (3,239 transactions, 22 percent of total). E-mail has seen a 31 percent growth since 2007, but represents only 4 percent of the total transactions. Telephone usage has decreased by 24 percent over the past two years and face-to-face, by far still the most popular reference service at 68 percent of all recorded transactions, has decreased by 21 percent overall. For all types of reference transactions, overall, the department has seen a 32 percent decrease in total since 2005.

DISCUSSION

The results of this study both support and extend the findings of previous research. Face-to-face reference is still the preferred method among university users. E-mail, telephone, and online chat also remain viable options. The type of question does influence the type of reference medium preferred. Text messaging, despite being popular socially, is not a preferred method of seeking reference services. Online voice and video conferencing (i.e. Skype, Google chat, etc.) is similarly not preferred for reference services although data suggests there may be underlying potential and preference among younger users as they become more prevalent in daily use.

Overall, the study's findings can be explained by Poole's Principle of Least Effort.[29] This principle posits that information seekers will attempt to minimize the overall work associated with seeking information and will seek the most convenient source to meet their information needs. Participants in this study appear to prefer the specific type of reference medium that most conveniently meets their needs at any given time. A person's role may, in turn, determine the depth of an information need, thereby influencing their choice of reference medium. The overall implications of the study are discussed within the context of the study's three research questions.

Research Question 1. Which Virtual Reference Mediums Do Library Reference Users Prefer?

At the university that was studied, based on participant survey responses, only four reference services that involve direct

contact with a librarian are used with any degree of frequency—face-to-face (49 percent), e-mail (36 percent), telephone (24 percent), and online chat/instant messaging (15 percent). Usage metrics support these four reference mediums. While face-to-face walk up reference service is still consistent and ongoing, e-mails tend to be less general and more specific to librarians who are assigned to support various academic units, leaving online chat/instant messaging as the primary general reference service activity that takes place frequently.

Research Question 2. Are There Differences in User Preferences for Virtual Reference Mediums Based on Type of Question?

In support of the findings discussed in the literature review, this study's findings suggest that user preferences for virtual reference services do indeed differ by the type of question.[30] User rankings differed significantly for seeking help with a factual question using telephone, e-mail, and text. Rankings for online chat and Skype were more equally dispersed. For research questions, user preferences were statistically significantly different for all five virtual reference types.

For telephone, respondents noted the convenience for asking quick factual questions. One staff member noted, "A quick fact for something simple—just call and wait for an answer." A student noted, "I would call a member of the staff because it saves time from walking all the way down to the library to find something so simple out."

Respondents who preferred e-mail emphasized the ability to explain themselves fully and deliberately, the digital record of the conversation, and being able to multi-task while waiting for a librarian's response. One faculty respondent explained, "I prefer to explain my questions fully and get feedback over e-mail because I often am multitasking and this option allows me to move on to another task while the librarian gets back to me." A staff member noted, "I'd start with an email so I'd have info in writing."

Research Question 3. Are There Differences in User Preferences for Virtual Reference Based on Type of User and Type of Question?

The study's findings suggest that based on university status, age, gender, and race, specific users have particular reference preferences based on type of question. Faculty, staff, and graduate students ranked telephone for factual questions at significantly higher levels than undergraduate students. Faculty and staff prefer using e-mail for factual questions at significantly higher levels than both undergraduate and graduate students while students have a significantly higher preference for using text messaging. Interestingly, all user groups rated online chat relatively high for seeking help with a factual question. Undergraduates noted the immediacy and ease-of-use for chat in comparison to other methods, "In this instance chat and telephone are the fastest way to obtain a short answer with little trouble. Sending texts is quick but

sentences are still limited, while e-mails may take some time to be answered and video referencing is too much trouble just for a short answer."

For research questions, respondent preferences differed significantly across all five virtual reference mediums. Faculty, staff, and graduate students preferred e-mail at statistically significantly higher levels than undergraduates, while undergraduate students preferred online chat at significantly higher levels than faculty and staff. Faculty and staff again emphasize that telephone and e-mail are preferred because they are more convenient for both user and librarian, quicker, and easier for them to use.

In contrast, students tend to see it the other way, finding online chat and texting to be quicker, more convenient, and allowing for an exchange of web links, "The online chat and e-mail references allow for an easy and elaborate conversation with little trouble, while telephoning may be difficult to multi task."

There are many potential reasons to explain the reference medium preferences among types of users. Similar to the findings of De Groote et al., the findings of the current study suggest "as users have become more sophisticated information seekers, their demands of librarians have evolved to require more . . . in-depth assistance rather than traditional ready reference questions."[31] Considering the depth of information needs of undergraduates may be, on average, less than those of graduate students and university faculty, this may explain undergraduate trends which show a preference for online chat while upper level researchers tend to prefer mediums which allow for more in-depth assistance from a librarian such as e-mail.

The Impact of Gender, Age, and Race on Virtual Reference Preferences

No significant trends emerged for gender and virtual reference preferences except for one small significant difference where females ranked text messaging lower as a reference medium. Closer examination by age showed that this difference was largely because the younger age group preferred text (males who were 24 years or younger ranked text second overall while females who were 24 and younger ranked text third overall) but this demographic only represented 20 percent ($n = 157$) of the entire sample and males ($n = 25$) were only a small portion of this. A preference for text messaging reference among younger populations comes as no surprise when one considers CTIA's research report, "A Generation Unplugged," which revealed an exponential increase in text messaging among young adults aged 13 to 19 years.[32] Males in older age groups preferred text at much lower rates, thereby creating a statistically significant gap between female and male rankings for text. Gender was also found to be a significant covariate with text for both factual and research questions as well as selection of only one reference medium when face-to-face was included for factual questions. Females preferred almost equally—telephone (24 percent), e-mail (21 percent), online chat (20 percent), and

other (18 percent), while males preferred telephone at higher levels (30 percent) and e-mail (21 percent), other (21 percent), and online chat (14 percent) at lower levels.

Age was found to be a significant factor. Younger participants ranked text messaging for reference services at significantly higher levels than all other groups. Interestingly, older participants (55–64) ranked telephone at significantly higher levels than younger age groups. Rankings for e-mail formed a perfect inverse relationship between age and rankings as the youngest group ranked it the lowest and the oldest age group ranked e-mail the highest. Controlling for age as a covariate accounted for the differences found between participant groups for telephone for both factual and research questions but not for e-mail and text.

Unexpectedly, race was found to be a statistically significant factor for participant rankings for virtual reference mediums. For factual reference questions, white participants preferred e-mail at significantly higher levels than all other races other than black participants, while Asian/Pacific Islanders and multiracial participants preferred Skype at higher levels than other racial groups. Black participants preferred online reference at lower levels than all other racial groups while preferring text at higher levels. For research questions, white participants rated e-mail higher than black participants, while black participants rated e-mail significantly lower than both white and Asian/Pacific Islander participants. There are some potential social marketing and communication questions that could be explored with these preliminary findings.

Controlling for gender, age, and race accounted for the significant differences found for telephone (older participants preferred telephone) for both factual and research questions while rankings for e-mail and text were still found to be significantly different across participants and type of question. Independent of these three factors, faculty and staff rankings for e-mail were statistically significantly higher than both undergraduate and graduate students for seeking reference help for both factual and research questions. Examining the open ended responses for faculty and staff found that e-mail was rated second to only telephone for factual questions and the top choice for research questions for five reasons: *familiarity*, *least obtrusive*, *most convenient*, *the ability to multitask*, and *existence of a digital record in writing*. Of significant note was that, although not one of the answer choices, the overall majority felt that locating quick factual information such as library hours would be easiest by quickly scanning the library's website.

In contrast, student rankings for text, although still ranked lower than telephone, e-mail, or online chat, were statistically significantly higher than faculty and staff for seeking reference help for factual and research questions. For students it is all about convenience and "the need for speed."

Students also rated online chat significantly higher than faculty and staff for research questions, with comments focusing on four factors: quick and easy, convenience, familiarity, and it is free, unlike text. One respondent noted, "Online chat is easy and quick with internet access. I use it most often to communicate with people. Texting is the same concept. I also constantly check my email but its 3rd because it can take longer than online chat for a response. Telephone is fine also but I would not like to video chat with someone I don't know."

Similarly, controlling for these three factors did not impact the significant differences found for participant preference when asked to select only one reference medium including face-to-face for factual questions.

LIMITATIONS AND FUTURE RESEARCH

The study has four primary limitations. First, the sampling frame involves participants from only one mid-sized university. Although much of the results align well with previous findings, they cannot be generalized beyond the population studied. Second, 28 percent of the participants had no prior experience with reference services at the library and therefore were offering relatively uninformed opinions on which services they would prefer. Certainly this weakens the overall validity of the study's findings. Third, the researchers did not include the option of the 24/7 online chat service available through the NCknows cooperative in their survey questions. Lastly, the online survey used did not provide use of the library's website as a reference option, which was noted a number of times in the "other" category. Providing this as one of the options would have further clarified the role of this type of "self-service" reference activity.

Future research opportunities will focus on replicating this study with other university populations to see if the findings remain consistent. In addition, deeper analysis on how university users seek and attain information from the library will help inform the study's findings in a richer, more descriptive fashion.

CONCLUSION

Libraries across the country are beginning to develop virtual reference services to meet the continuously increasing demands of remote library users. A nationwide survey found that 56 percent of the nation's public and academic libraries ($N = 965$) reported offering virtual reference. Of those, 48 percent ($n = 295$) offer chat, while 86 percent ($n = 532$) provide e-mail support.[33] As libraries continue to add online chat and e-mail reference service mediums and begin to consider adding text messaging and video conference reference, research suggests users' preferences for these services will be dependent upon the type of question and type of information seeker.

Though Skype video conferencing and text messaging reference received relatively low preference ratings in this study, libraries must carefully watch the trends, particularly among younger generations as these technologies become more prevalent modes of daily communication. Research suggests that today's adolescent population will continue to be heavy text messaging users. Academic libraries must be poised to

respond to these quickly emerging information seeking trends as this generation will soon be arriving on college campuses. Further, video conferencing may hold a place in the future of academic libraries. As mobile texting and video conferencing become more commonplace and user friendly, it may be only a matter of time before library users begin to demand these types of reference services as well. Familiarity, convenience, and speed appear to be the primary factors behind user information seeking preferences both for face-to-face and virtual reference services. Online chat appears to be the emerging reference of choice for the younger generation, while e-mail and telephone are preferred by users more than 25 years old. Information seekers appear to seek library reference services through the mediums they are already using. While the type of question is a factor, our findings suggest that the most important factor is age and comfort level with the technology they use on a day-to-day basis. Despite the growing plethora of ways for library users to seek help through technology mediums, face-to-face would appear to still be the preferred method of choice for library reference services for users in a university academic setting.

References

1. American Library Association, *The State of America's Libraries—2010* (Chicago: ALA, 2010).
2. Char Booth, "Developing Skype-Based Reference Services," *Internet Reference Services Quarterly* 13, no. 2–3 (2008): 148.
3. Laura K. Probst, "Digital Reference Management: A Penn State Case Study," *Internet Reference Services Quarterly* 10, no. 2 (2005): 53.
4. Marie L. Radford and M. Kathleen Kern, "A Multiple-Case Study Investigation of the Discontinuation of Nine Chat Reference Services," *Library & Information Science Research* 28 (2006): 521–47; Michael C. Atlas, "Library Anxiety in the Electronic Era, or Why Won't Anybody Talk to Me Anymore?" *Reference & User Services Quarterly* 44, no. 4 (2005): 314–19; R. David Lankes, "Virtual Reference to Participatory Librarianship: Expanding the Conversation," *Bulletin of the American Society for Information Science and Technology* 34, no. 2 (2008): 11–14.
5. Xiangming Mu et al., "A Survey and Empirical Study of Virtual Reference Service in Academic Libraries," *Journal of Academic Librarianship* 37, no. 2 (Mar. 2011): 126–27.
6. Booth, "Developing Skype-based Reference Services," 147–65; Kelly M. Broughton, "Usage and User Analysis of a Real-Time Digital Reference Service," *Reference Librarian* 38, no. 79 (2002): 183–200; Joel Cummings, Lara Cummings, and Linda Frederiksen, "User Preferences in Reference Services: Virtual Reference and Academic Libraries," *portal* 7, no. 1 (Jan. 2007): 81–96; Christina M. Desai, "Instant Messaging Reference: How Does It Compare?" *Electronic Library* 21, no. 1 (2003): 21–30; J. B. Hill, Cherie M. Hill, and Dayne Sherman, "Text Messaging in an Academic Library: Integrating SMS into Digital Reference," *Reference Librarian* 47, no. 1 (2007): 17–29; Nora Hillyer and Linda L. Parker, "Video Reference—It's Not Your Typical Virtual Reference: Video Reference Services at the University of Nebraska at Omaha," *Internet Reference Services Quarterly* 11, no. 4 (2006): 41–54.
7. Cummings et al., "User Preferences in Reference Services," 92.
8. Corey M. Johnson, "Online Chat Reference," *Reference & User Services Quarterly* 43, no. 3 (Spring 2004): 241.
9. Diane Granfield and Mark Robertson, "Preference for Reference: New Options and Choices for Academic Library Users," *Reference & User Services Quarterly* 48, no. 1 (Fall 2008): 48.
10. Hill et al., "Text messaging in an Academic Library," 24.
11. Susan Lessick et al., "Digital Video: The Next Step in Reference and Education," in *ACRL Eleventh National Conference* (Chicago: ALA, 2003), www.ala.org/ala//mgrps/divs/acrl/events/pdf/lessick3.pdf (accessed Aug. 2, 2011).
12. Booth, "Developing Skype-based Reference Services," 163.
13. Desai, "Instant Messaging Reference," 30.
14. David Ward, "Why Users Choose Chat: A Survey of Behavior and Motivations," *Internet Reference Services Quarterly* 10, no. 1 (2005): 37.
15. Ian J. Lee, "Do Virtual Reference Librarians Dream of Digital Reference Questions? A Qualitative and Quantitative Analysis of Email and Chat Reference," *Australian Academic & Research Libraries* 35, no. 2 (June 2004): 104.
16. Hill et al., "Text Messaging in an Academic Library," 25.
17. Marguerite Reardon, "Text Messaging Explodes In America," CBSNews.com, Sept. 23, 2008, www.cbsnews.com/stories/2008/09/23/teh/cnettechnews/main4471183.shtml (accessed Aug. 2, 2011).
18. Booth, "Developing Skype-based Reference Services," 157.
19. Herbert Poole, *Theories of the Middle Range* (Norwood, N.J.: Ablex, 1985).
20. Richard Rubin, *Foundations of Library and Information Science* (New York: Neal-Schuman, 2004): 45.
21. Nancy J. Young and Marilyn Von Seggern, "General Information Seeking in Changing Times: A Focus Group Study," *Reference & User Services Quarterly* 41, no. 2 (Winter 2001): 6.
22. Sandra De Groote, Kristin Hitchcock, and Richard McGowan, "Trends in Reference Usage Statistics in an Academic Health Sciences Library," *Journal of the Medical Library Association* 95 (2007): 26.
23. Ward, "Why Users Choose Chat," 27.
24. Van Houlson, Kate McCread, and Carla Steinburg Pfahl, "A Window into our Patron's Needs," *Internet Reference Services Quarterly* 11 no. 4, (2007): 30–31.
25. Carly Lejnieks, "A Generation Unplugged," CTIA-The Wireless Association, 2008, http://files.ctia.org/pdf/HI_TeenMobileStudy_ResearchReport.pdf. (accessed Aug. 2, 2011).
26. Lynn Silipigni Connaway and Marie L. Radford, "Virtual Reference Service Quality: Critical Components for Adults and the Net-Generation," *Libri* 60, no. 2 (June 2010): 165.
27. University of North Carolina at Greensboro, "About UNCG," UNCGSpartans.com, 2010, www.uncgspartans.com/information/About_UNCG (accessed Aug. 2, 2011).
28. Mary Krautter, Head, Reference and Instructional Services, UNCG Jackson Library, discussion with the authors, Dec. 20, 2010.
29. Poole, *Theories of the Middle Range*.
30. Desai, "Instant Messaging Reference"; Lee, "Do Virtual Reference Librarians Dream of Digital Reference Questions?"; Hill et al., "Text Messaging in an Academic Library."
31. De Groote et al., "Trends in Reference Usage Statistics," 26.
32. Lejnieks, "A Generation Unplugged."
33. Anthony S. Chow et al., "What is a Usable Library Website? Results from a Nationwide Survey," (unpublished manuscript, University of North Carolina at Greensboro, LIS Dept., 2010).

APPENDIX A. LIBRARY REFERENCE SERVICES SURVEY—AWARENESS AND PREFERENCES

(The survey was created using SurveyMonkey and distributed electronically via e-mail.)

1. Which ONE of the following best describes you?
   • Undergraduate student
   • Graduate
   • Faculty
   • Staff
2. What is your gender?
   • Male
   • Female
3. What is your age?
   • Under 24
   • 25–34
   • 35–44
   • 45–54
   • 55–64
   • 65 and up
4. What is your ethnicity?
   • White
   • Black
   • American Indian or Alaska Native
   • Asian
   • Native Hawaiian or Other Pacific Islander
   • Multiracial
   • Other
5. Which of the following library reference services have you used at the University Libraries? (Check all that apply.)
   • Face-to-Face Consultation (worked with a reference librarian at the reference desk or made an appointment with a reference librarian)
   • Telephone Consultation (called the reference desk and spoke with a reference librarian)
   • E-Mail Reference (e-mailed your question to a reference librarian and received a reply)
   • Online Chat Reference (chatted online with a reference librarian about your question)
   • Skype Video Reference (conferenced via Skype video with a reference librarian about your question)
   • Text-a-Librarian Reference (sent a text message question via your cell phone or mobile device to a reference librarian and received a reply)
   • None
6. Before you took this survey, were you aware that your campus library offered:

	Yes	No
Face-to-Face Consultation		
Telephone Consultation		
E-mail Reference		
Online Chat Reference		
Skype Video Reference		
Text-a-Librarian Reference		

7. Please rank order your preference of virtual reference formats (1 = highest, 5 = lowest) if you needed help locating materials for a research project (example: locating biographical information for an author without using Google).

	1	2	3	4	5
Telephone Consultation					
E-mail Reference					
Online Chat Reference					
Skype Video Reference					
Text-a-Librarian Reference					
Please elaborate on the rationale for your rankings:					

8. Please rank order your preference of virtual reference formats (1 = highest, 5 = lowest) if you needed help finding a quick fact (example: finding the hours of the library for the week).

	1	2	3	4	5
Telephone Consultation					
E-mail Reference					
Online Chat Reference					
Skype Video Reference					
Text-a-Librarian Reference					
Please elaborate on the rationale for your rankings:					

9. If you decided to get reference help locating materials for a research project (example: locating biographical information for an author without using Google), which ONE of the following options for assistance would you most likely choose first?
   • Face-to-Face Consultation
   • Telephone Consultation
   • E-mail Reference
   • Online Chat Reference
   • Skype Video Reference
   • Text-a-Librarian Reference
   • Other
   Please feel free to elaborate:

10. If you needed help finding a quick fact (example: finding the hours for the library for the week), which ONE of the following options for assistance would you most likely choose first?
   • Face-to-Face Consultation
   • Telephone Consultation
   • E-mail Reference
   • Online Chat Reference
   • Skype Video Reference
   • Text-a-Librarian Reference
   • Other
   Please feel free to elaborate:

11. How likely are you to use each of these types of library reference services at the University Libraries in the future?

Likelihood to Use (Scale of 1–10)	(1 = Not at all Likely, 10 = Very Likely)									
Face-to-Face Consultation	1	2	3	4	5	6	7	8	9	10
Telephone Consultation	1	2	3	4	5	6	7	8	9	10
E-mail Reference	1	2	3	4	5	6	7	8	9	10
Online Chat Reference	1	2	3	4	5	6	7	8	9	10
Skype Video Reference	1	2	3	4	5	6	7	8	9	10
Text-a-Librarian Reference	1	2	3	4	5	6	7	8	9	10
Please feel free to elaborate:										

APPENDIX B. REFERENCE LIBRARIAN FOCUS GROUP QUESTIONS

1. In your role as academic librarians at XXXX, which reference mediums have you used to provide reference services to students? (e-mail, telephone, online chat, Skype video, text messaging)
2. Based upon your experience, which of the reference mediums (e-mail, telephone, online chat, Skype video, text messaging) is most popular with library patrons at this university? Please feel free to elaborate.
3. Which of the five reference mediums (e-mail, telephone, online chat, Skype video, text messaging) do you prefer?
4. Which do you prefer to use for answering basic factual questions?
5. How about for procedural (How To) reference questions?
6. Where do you think the future of virtual reference is heading?